

$$Z \rightarrow b \bar{b}$$

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Zbb group meeting

10/09/02

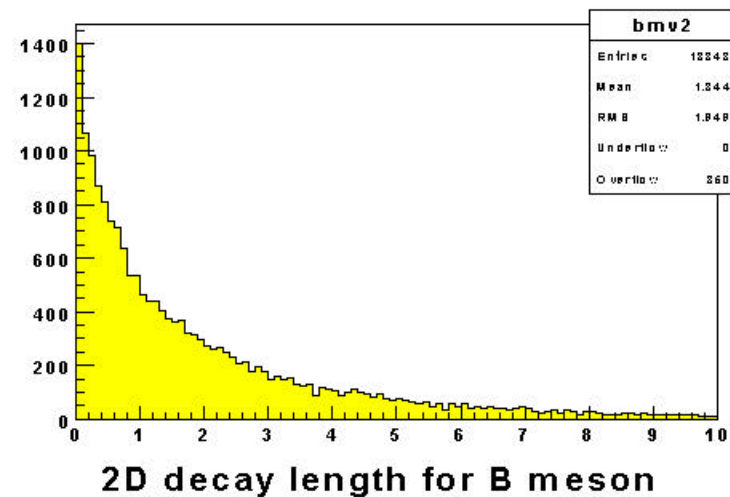
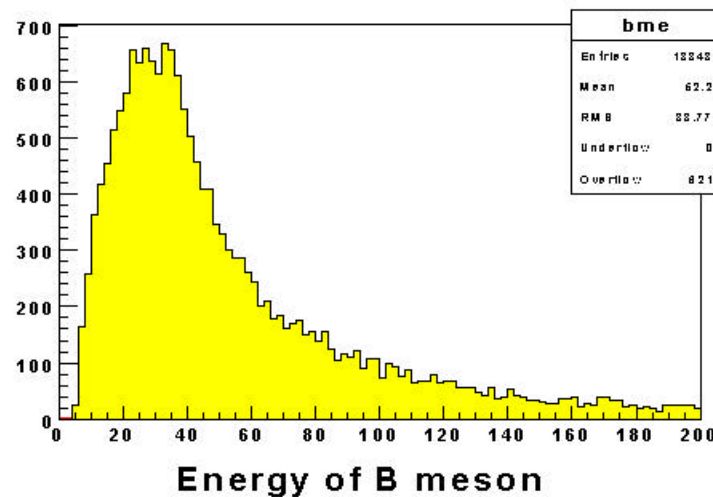
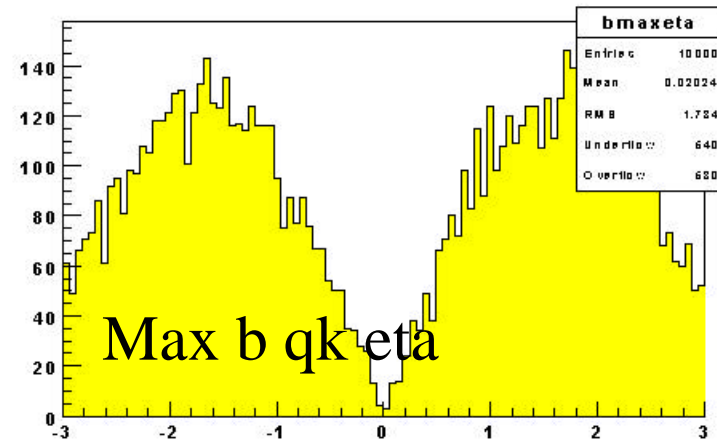
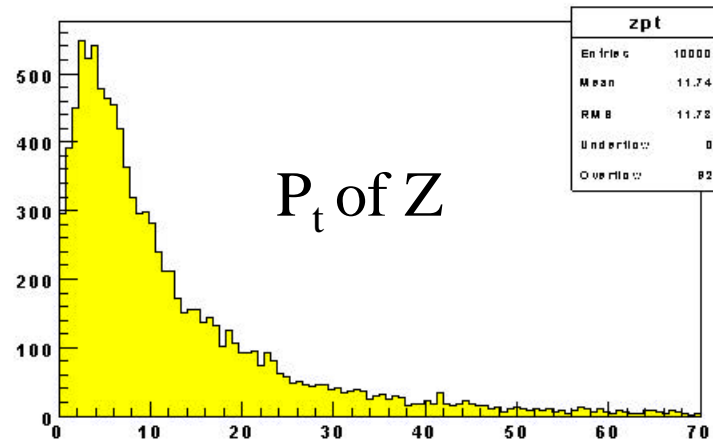
New $Z \rightarrow b b$ trigger

- Level 2:
 - Two SVT tracks with
 - $P_t > 2.5 \text{ GeV}$
 - $150 \text{ um} < d_0 < 1 \text{ mm}$
 - $d\Phi > 150^\circ$
- Level 3:
 - $P_t^1 > 2.5 \text{ GeV}$
 - $P_t^2 > 3.5 \text{ GeV}$
 - $|\eta_{\text{jet}}| < 1$
 - $E_t^{\text{jet}} > 10 \text{ GeV}$

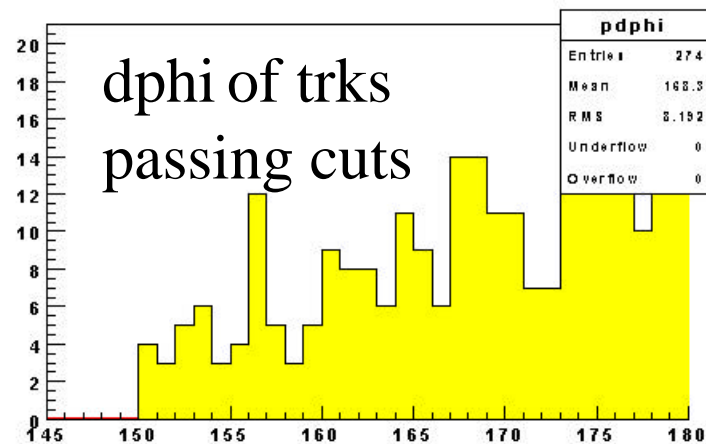
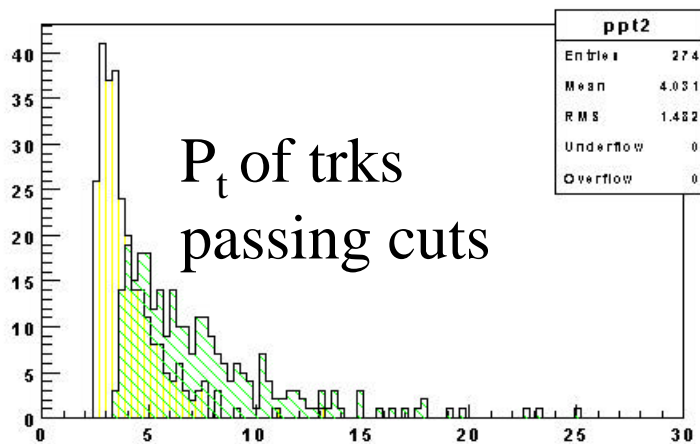
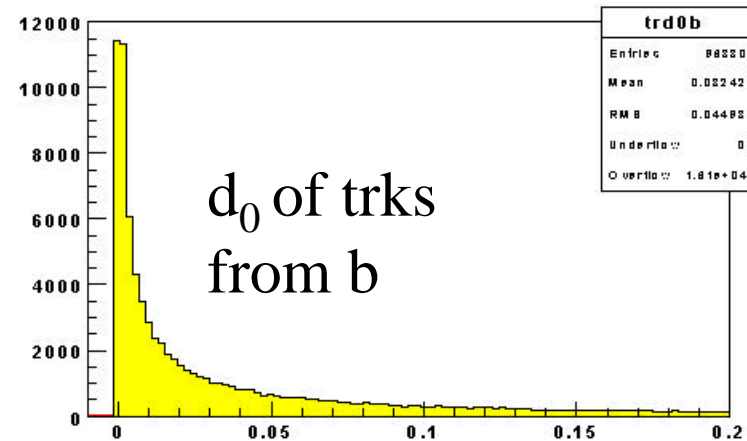
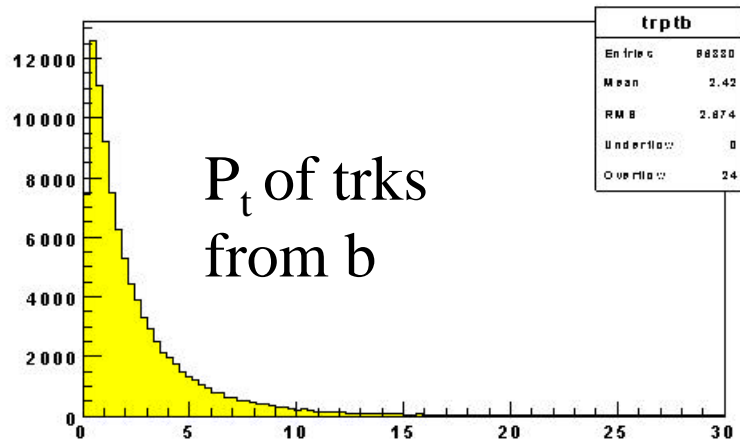
From CDF note 6036: expected rates:

Level 2:	36 nb	3.7 % eff.
Level 3:	14 nb	2.16 % eff.

Some HEPG distributions



More HEPG distributions

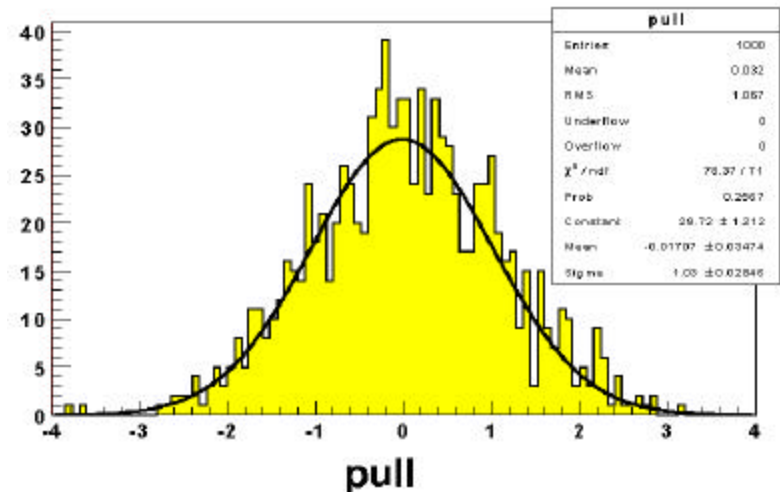
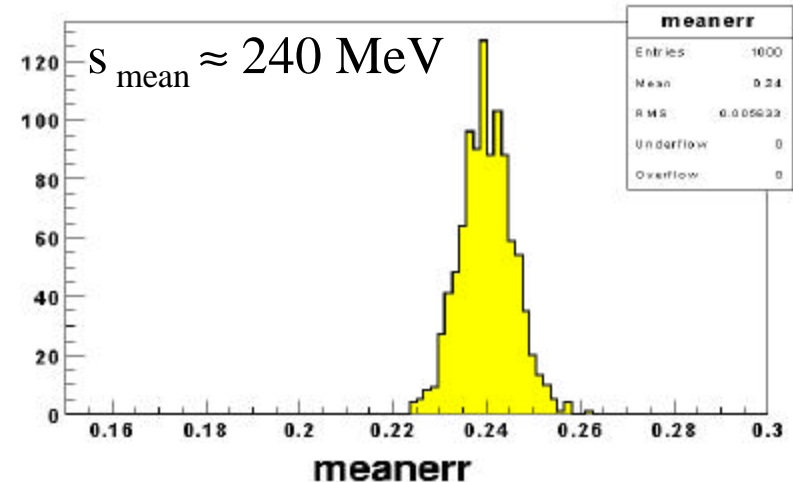


- So 274/10000 events pass cuts, or 2.74%.
- Agrees reasonably well with 2.16% from CDF 6036.

How well can we do?

1000 pseudo-experiments:

- Given 200 pb^{-1} :
- The best case (ignoring background) gives
- $914 \text{ pb (from HERWIG)} * 200 \text{ pb}^{-1} * .0274 = 5000 \text{ evts.}$
- Assuming Z mass resolution per event of 15 GeV (Gaussian), that gives a b energy scale determination to 240 MeV.
- Using 1.13% (double tagged events) from CDF 6036, that becomes $\sim 400 \text{ MeV}$.



What about two track trigger?

- Level 2:
 - $P_t^1 > 2 \text{ GeV}$
 - $P_t^1 + P_t^2 > 5.5 \text{ GeV}$
 - $2^\circ < \text{Dphi} < 135^\circ$
 - $120 \text{ um} < d_0 < 1 \text{ mm}$
 - No calorimeter requirements
- B->D pi type trigger
- Basically a “one b” trigger, where the Zbb path is a “two b” trigger.
- In my generator-level simulation, the efficiency for Zbb is $\sim 18\%$!!
- Question is: Are these useful extra events?

Partial answer...

